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(71) Applicant (for all designated States except US): MASS ENGINEERED DESIGN [CA/CA]; 510 Front St. West, Suite 300, Toronto, Ontario M5V 1B8 (CA).

(72) Inventor; and

(75) Inventor/Applicant (for US only): MOSCOVITCH,

Jerry [CA/CA]; 59 Cowar Avenue, Toronto, Ontario M6K 2N1 (CA).

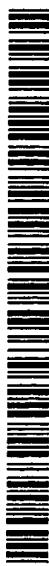
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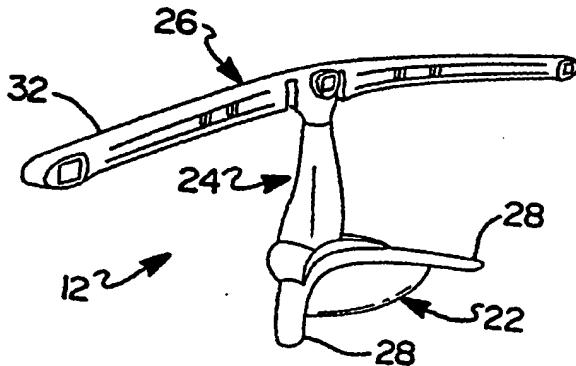
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(54) Title: HORIZONTAL THREE SCREEN LCD DISPLAY SYSTEM



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(57) Abstract: A three screen LCD display system (10) wherein the three LCD screens (14-18) are mounted on a single horizontal support arm (26) and elevated above a work surface by a base assembly (22). The base assembly includes a base member and a vertical support column (24). The horizontal support arm is preferably bowed slightly so as to present the three screens in a "wrap around" fashion to the user when the user is seated or standing directly in front of the display system. The horizontal support arm includes a support member which is securable via a conventional fastening element to a portion of the support column. A cover (54) may also be disposed over a rear portion of the vertical support column. The horizontal support arm also includes a channel for helping to support power and video cables therein.

## HORIZONTAL THREE SCREEN LCD DISPLAY SYSTEM

### Technical Field

This invention relates to display systems for computers, and more particularly to  
5 a multi-screen display system for use with a computer system, where the multi-screen display system includes three independent liquid crystal display screens disposed adjacently to one another on a common arm extending along a horizontal plane.

### Background of the Invention

Multi-screen displays are becoming more and more popular for use in various  
10 businesses, such as in financial institutions, stock market brokerage firms, engineering companies and the like. These displays are commonly coupled to a single computer and capable of displaying various graphs, charts and other important information simultaneously. Thus, a large amount of data or information can be displayed to the user at any given time, and without the user having to partially cover portions of the  
15 information in a "windowed" or layered arrangement, as would be necessary with only a single display screen.

Up until the present, most multi-screen display systems have been limited to two independent display screens positioned side-by-side. The angle of the screens relative to each other has usually not been adjustable, and often the displays have  
20 been required to be set directly on a table or desk, thereby using a significant amount of space. To date, there has not been a convenient and efficient means to provide three independent display screens and to support the three screens in a manner which minimizes the footprint area of the system, and which still allows one or more of the screens to be adjusted slightly such that at least two of the screens can be angled  
25 or "booked" toward each other to further enhance the ease with which information can be viewed on the three screens.

It is therefore an object of the present invention to provide a display system for use with a computer system, where the display system incorporates three independent display screens supported on a common horizontal support arm, and elevated by a support column so as significantly reduce the footprint area required by the display  
30 system.

It is another object of the present invention to provide a display system for use with a computer system, where the display system incorporates three independent

liquid crystal display (LCD) screens mounted on a common, horizontally disposed arm.

It is still another object of the present invention to provide a display system for use with a computer system, where the display system incorporates three independent LCD screens, and wherein at least two of the screens are capable of being angled or  
5 "booked" toward each other to optimize the viewing angle of the screens relative to the user.

#### SUMMARY OF THE INVENTION

The above and other objects are provided by a multi-screen display system in accordance with preferred embodiments of the present invention. In one preferred embodiment the display system comprises a base, a support column extending vertically from the base, a horizontally disposed support arm supported on the column, and three independent liquid crystal display (LCD) screens supported on the support arm. In one preferred embodiment each of the LCD screens is coupled to the support arm by a suitable ball joint which allows the viewing angle of each screen to be  
15 adjusted to optimize the viewing angle of each screen.

The base is substantially smaller in width than the horizontal support arm, thus freeing up a significant amount of desk space. Since LCD screens are employed, the entire display system is much more compact and able to be placed much closer to a wall or other vertical partition than would be possible with conventional cathode ray tube display systems. The horizontal support column, in one preferred form, is slightly bowed such that the three LCD screens are presented in a slight arc to the user when  
20 the user is seated in front of the display system. This further eases the manner in which information can be viewed on the two outer LCD screens.

The display system thus provides a compact yet convenient means for  
25 displaying a large amount of information simultaneously on three LCD screens in a manner allowing the user to easily view any one of the screens from a seated or standing position in front of the display system. The display system is sufficiently compact such that it can be used in work areas where three conventional cathode ray tube screens would be too bulky to employ.

#### 30 BRIEF DESCRIPTION OF THE DRAWINGS

The various advantages of the present invention will become apparent to one skilled in the art by reading the following specification and subjoined claims and by

referencing the following drawings in which:

Figure 1 is front view of a display system in accordance with a preferred embodiment of the present invention;

5 Figure 2 is a front view of just the support system with the LCD screens removed;

Figure 3 is a rear perspective view of just the support system of Figure 2;

Figure 4 is a front perspective view of the support system of Figure 2;

10 Figure 5 is a top perspective view of just the support system illustrating the slightly bowed configuration of the horizontal support arm;

Figure 6 is a perspective view of a portion of the horizontal support arm showing the mounting member, and a perspective view of a portion of the vertical support column illustrating the mounting member thereof, and a perspective view of the cover;

15 Figure 7 is perspective, enlarged view of a portion of the horizontal support arm showing the recess formed in the neck portion thereof;

Figure 8 is a perspective view of a portion of the horizontal support arm positioned for attachment to the vertical support column; and

20 Figure 9 is a perspective view of a portion of the horizontal support arm showing this arm ready for attachment, with the cover positioned thereover, to the vertical support column.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figure 1, there is shown a three panel liquid crystal display (LCD) display system 10 in accordance with a preferred embodiment of the present invention. The system 10 includes a support system 12 and three independent LCD screens 14, 16 and 18 which are supported above a work surface 20. The system 10 forms a means for presenting a large amount of information to a user seated or standing in front of the system 10. While not shown, it will be appreciated that each LCD screen 14, 16, and 18 includes its own video controller card which receives information from a computer system (not shown) associated with the display system 30 10.

Referring to Figures 2-5, the support system 12 can be seen in greater detail with the LCD screens 14, 16 and 18 removed. The support system 12 comprises a

base 22, a vertical support column 24 fixedly secured to the base 22, and a slightly bowed or arched horizontal support arm 26. The base 22 includes a pair of feet 28 which provide even further stability in supporting the LCD screens 14, 16 and 18. Preferably, the base 22 includes a weighted structure, such as a lead plate, which is 5 insert molded with the base to provide a suitably heavy structure for supporting the LCD screens 14, 16 and 18 in a manner that resists tipping of the screens 14, 16 and 18 if same are inadvertently bumped.

The vertical support column 24 is of a suitable height such that when the LCD screens 14, 16 and 18 are attached to the horizontal support arm 26, the screens are 10 all disposed above the work surface 20. This places the screens 14, 16, and 18 at a convenient viewing height for the user while also freeing up space under the two outer screens 14 and 18 for papers or other items which the user requires access to.

The horizontal support arm 26 is preferably formed (i.e., cast) as a single piece component and has three docking stations 26a, 26b and 26c where a suitable ball 15 joint is attached at each station. One such ball joint 30 is shown in simplified form in Figure 5 attached to docking station 26c. The ball joints 30 allow each LCD screen 14, 16 and 18 to be precisely angled or "booked" toward the other screens to optimize the viewing angle of each screen relative to the user. The slightly bowed configuration of the horizontal support arm further helps to place the LCD screens 14, 16 and 18 in 20 a manner such that the screens "wrap around" the user and further enhance the ease with which each screen may be viewed. The radius of curvature is preferably within a range of about 24" - 36", and more preferably about 30", which has been found to ergonomically maximize the convenience to the user in viewing the LCD screens.

The horizontal support arm 26 further includes a channel 32, visible in Figures 25 2, 4 and 5, which forms an area within which power and/or video cables can be positioned to help keep same off of the work surface 20.

Referring now to Figure 6, the horizontal support arm 26 includes a neck portion 34 having a mounting member or portion 36 protruding therefrom and a recess 38. The recess 38 can be seen in greater detail in the drawing of Figure 8. The 30 mounting member 36 includes an aperture 40 and an aperture 41. The neck portion also 34 includes an aperture 35.

The vertical support column 24 similarly includes a mounting member or portion

42 and a hollowed out area 44. Mounting member 42 includes an aperture 43. A first boss portion 46 has a threaded bore 48 and a second boss portion 50 has a threaded bore 52. A separate cover 54 is adapted to be secured to the vertical support column 24 by a plurality of external fastening elements (not shown) placed in apertures 56, 5 which extend into bores 58 formed in bosses 60, and into bore 52, within the hollowed out area 44. The cover 54 is shaped to cover the hollowed area 44 and to provide the appearance of an integrally formed portion of the vertical support column 24 when secured thereto.

Referring now to Figure 8, the mounting member 36 of the horizontal support arm 26 can be seen positioned for securing to the vertical support column 24. The mounting member 42 is inserted within the recess 38, and the mounting member 36 lays over the two boss portions 46 and 50 with apertures 40 and 41 aligned with apertures 48 and 52, respectively. An external fastening element (not shown) can then be inserted through aperture 40 and into bore 48, and a separate external fastening element (not shown) inserted into aperture 35 to engage in aperture 43. Further external fastening elements (not shown) can be inserted through apertures 56 and into bores 58 and 52 to secure the cover 54 to the vertical support column 24. The cover 54 is shown positioned on the support column 24 in Figure 9 ready to be secured thereto by external fastening elements.

It will be appreciated that the above-described arrangement permits the horizontal support arm 26 to be removed and an even longer horizontal support arm, possibly long enough to support four LCD screens, could be attached to column 24. Alternatively, a horizontal support arm adapted to support only two screens could just as easily be secured to the column 24. This construction thus lends itself very well to providing a modularly expandable display system.

It will be appreciated then that the display system 10 of the present invention provides a convenient, user friendly means for supporting three screens along an elevated, common horizontal support arm. This not only frees up workspace on the desk or table on which the display system 10 is disposed, but also presents the display screens at a height above the work surface that makes the display system comfortable to view.

Those skilled in the art can now appreciate from the foregoing description that

the broad teachings of the present invention can be implemented in a variety of forms. Therefore, while this invention has been described in connection with particular examples thereof, the true scope of the invention should not be so limited since other modifications will become apparent to the skilled practitioner upon a study of the  
5 drawings, specification and following claims.

## CLAIMS

1. A liquid crystal display (LCD) screen system comprising:
  - a base;
  - a vertical support column secured to the base;
  - 5 a bowed horizontally disposed support arm secured to the vertical support column, the horizontally disposed support arm including at least three docking stations; and
  - a corresponding plurality of LCD screens supported from said docking stations.

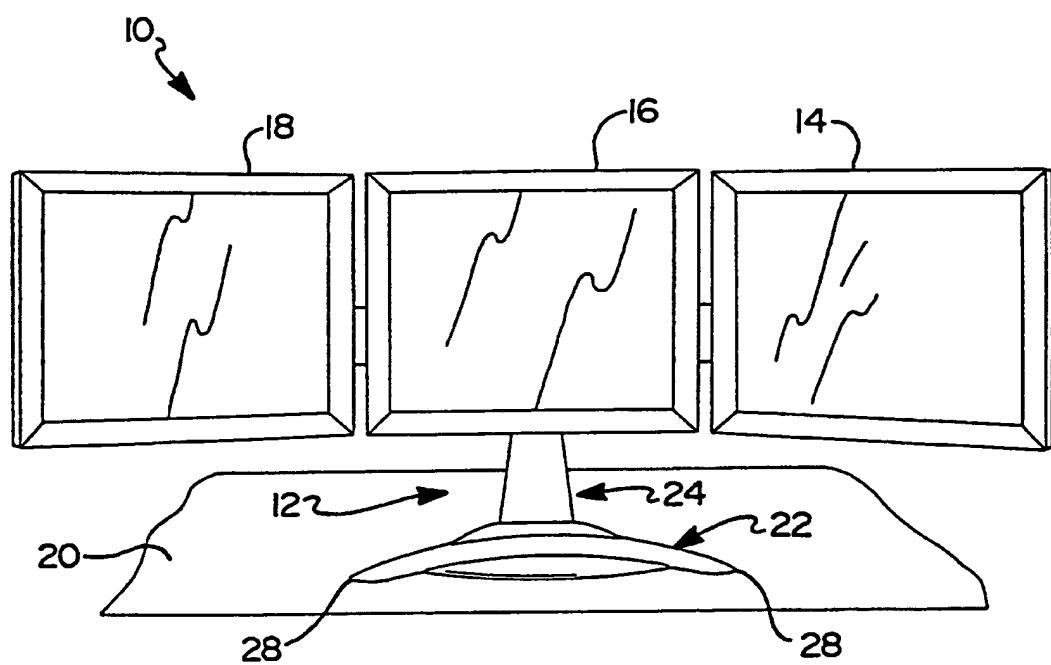


FIG 1

FIG 3

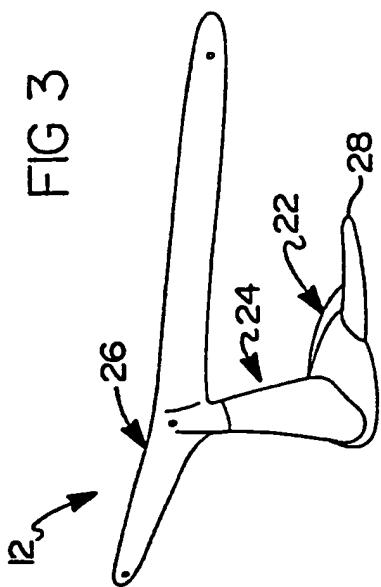


FIG 2

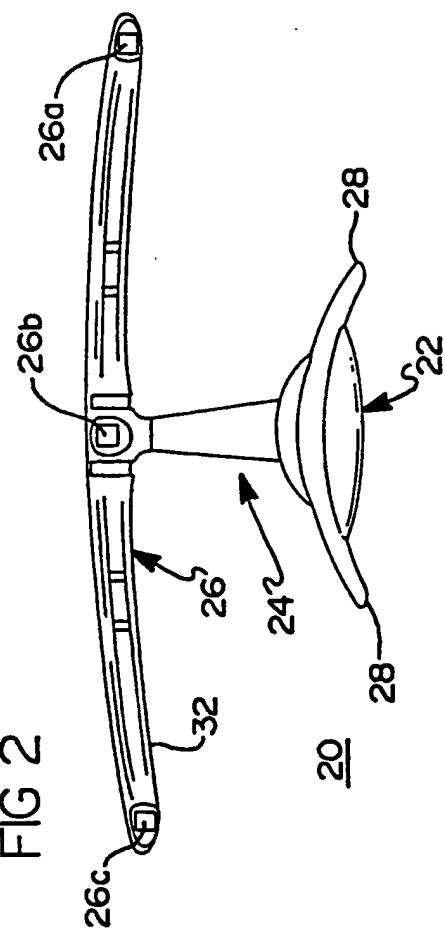


FIG 5

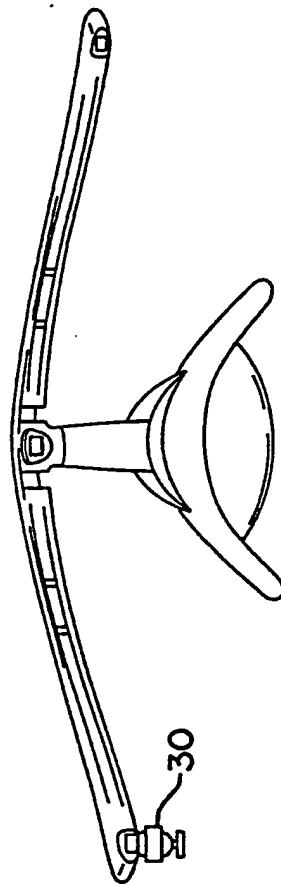
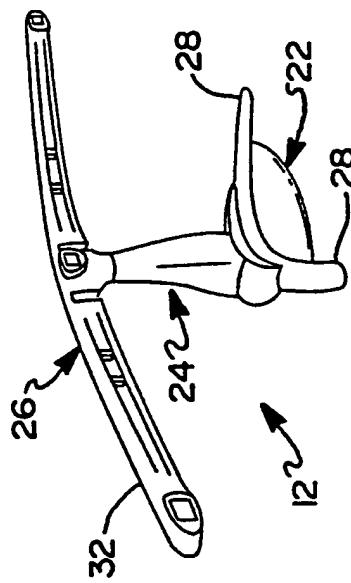
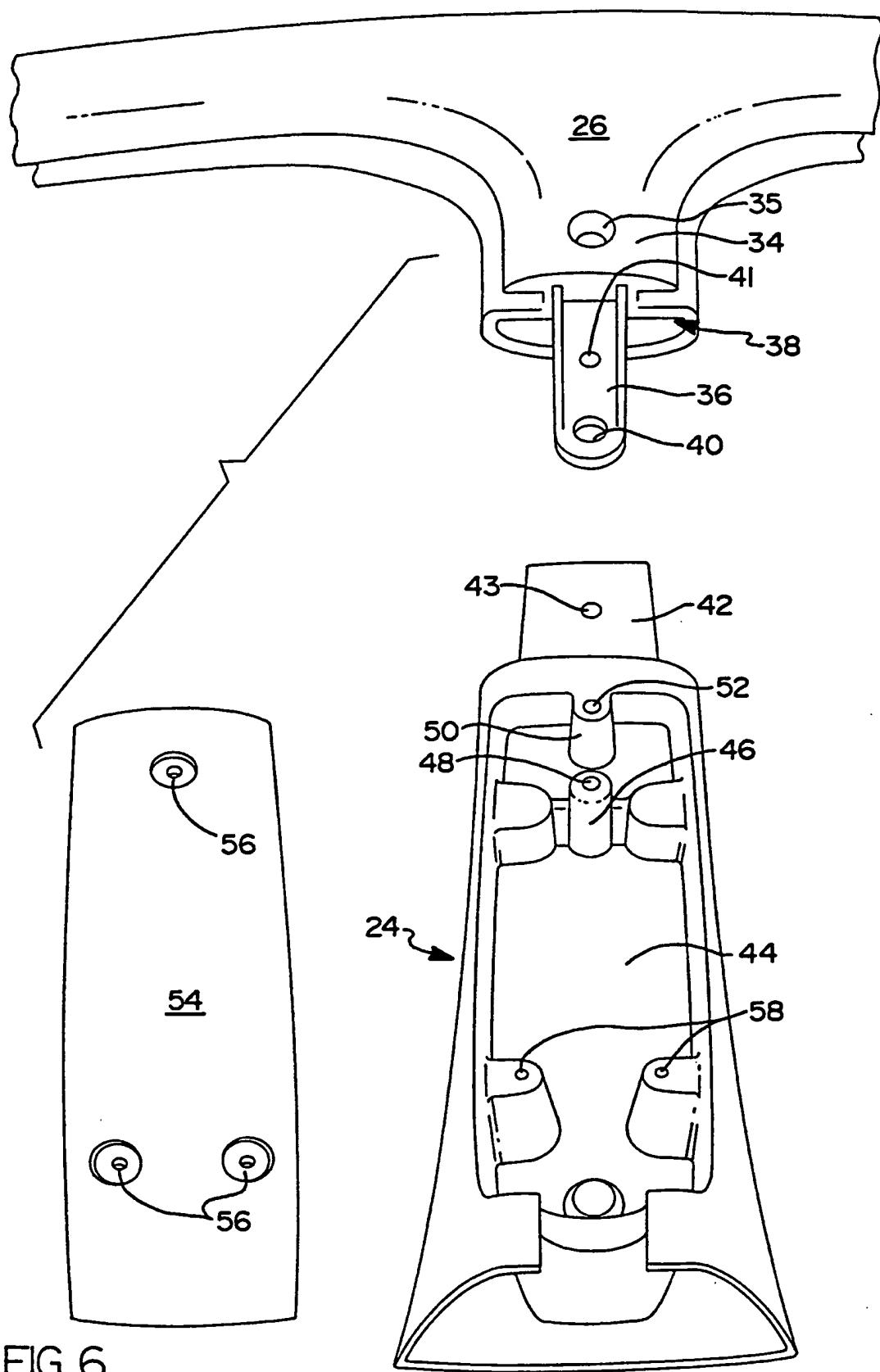


FIG 4



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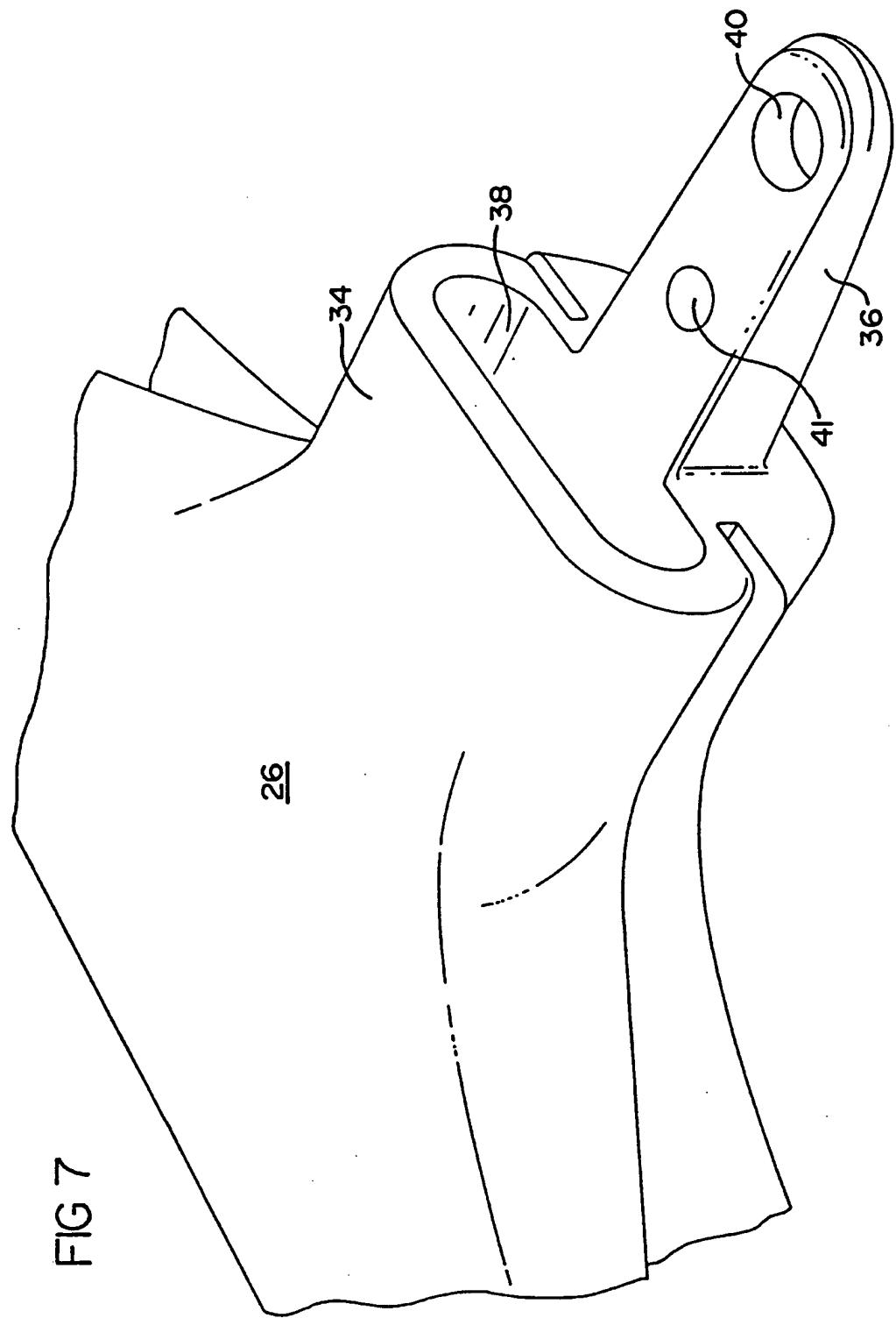
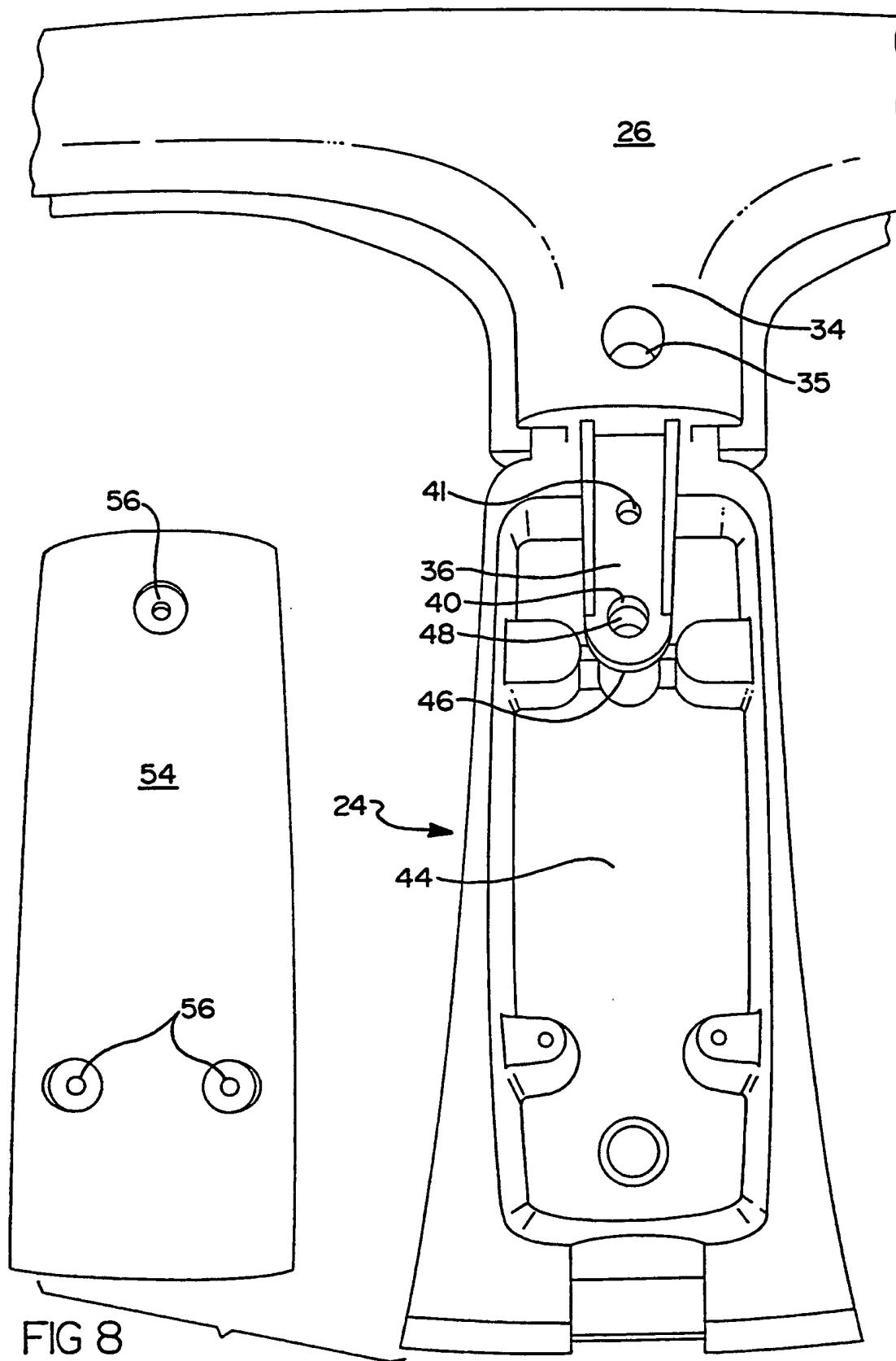


FIG 7



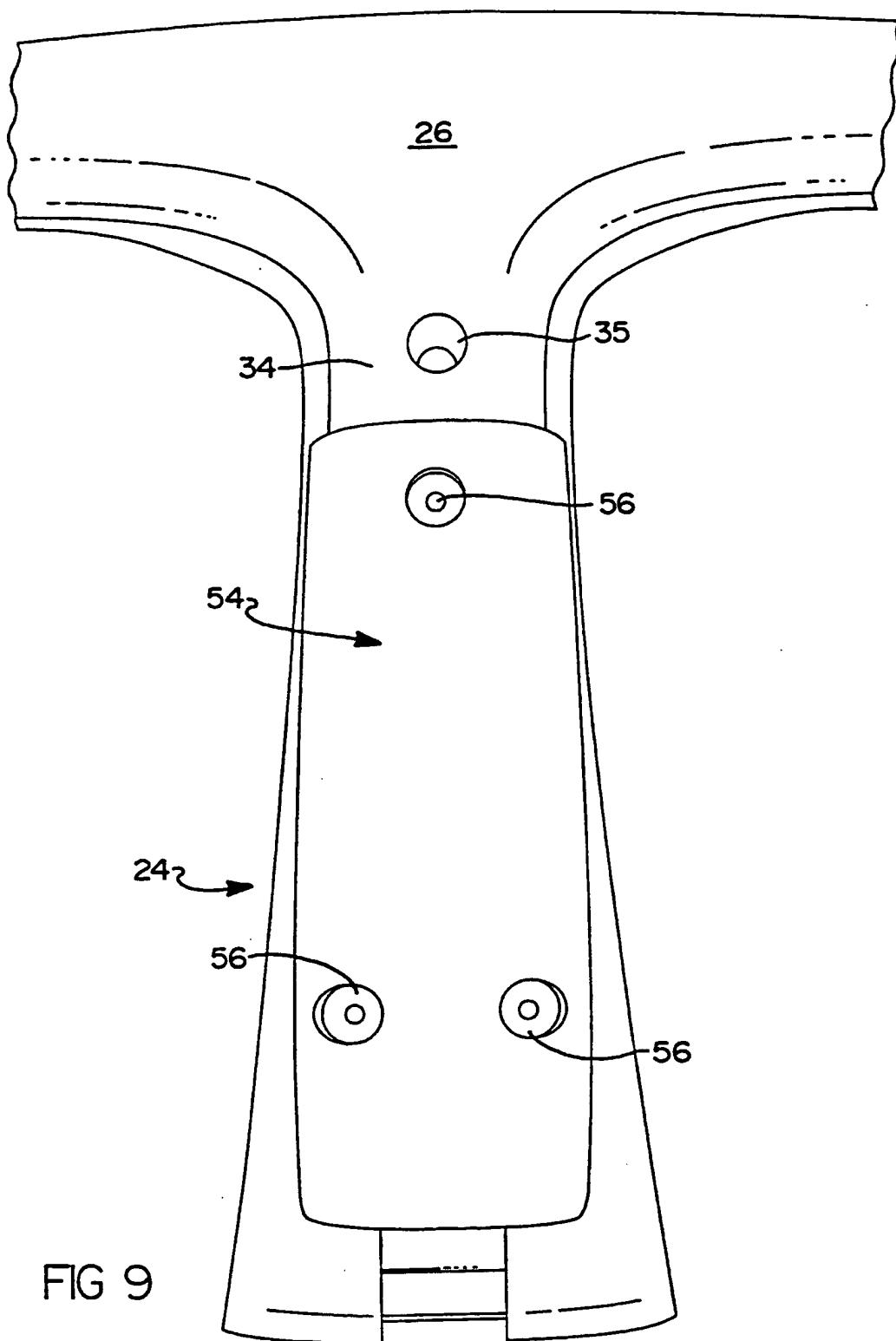


FIG 9

SUBSTITUTE SHEET (RULE 26)

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB 00/01646

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G06F1/16

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 G06F G09F F16M A47B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ, IBM-TDB, INSPEC, COMPENDEX

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 537 127 A (JINGU MASAHIRO) 16 July 1996 (1996-07-16) the whole document ---	1
A	WO 99 50813 A (MOWRY JEFF ;KREITZER DAVID F (US)) 7 October 1999 (1999-10-07) page 21, line 34 -page 22, line 17; figures 17,18 -----	1

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.  
Fax: (+31-70) 340-3016

Authorized officer

Ballas, A

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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PCT/IB 00/01646

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 5537127 A	16-07-1996	JP	6014886 A JP 6237903 A	25-01-1994 30-08-1994
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